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1 Routine/Function Prologues

1.0.1 clmlairead.F90: (Source File: clm2lairead.F90)

This program reads in AVHRR LAI data for CLM

REVISION HISTORY:

27 Nov 2001: Jon Gottschalck; Initial code
 20 Feb 2002: Jon Gottschalck; Modified to use for 1/4 and 2x2.5 using 1/8 degree monthly data
 01 Oct 2002: Jon Gottschalck; Modified to add MODIS LAI data

INTERFACE:

```
subroutine clm2lairead (ld,tile)
```

USES:

```
use clm_varder
use lis_module      ! LIS parameters
use tile_module     ! LIS Tile variables
use clmtype         ! 1-D CLM variables
use shr_const_mod, only : SHR_CONST_PI
use time_manager
use lisdrv_module, only : grid
```

CONTENTS:

```
!-----
! Determine current time to find correct LAI files
!-----
if (ld%t%tscount .eq. 0) then
  ld%t%yr = ld%t%syr
  ld%t%mo = ld%t%smo
  ld%t%da = ld%t%sda
  ld%t%mn = ld%t%smn
  ld%t%ss = ld%t%sss
else
  ld%t%yr = ld%t%yr
  ld%t%mo = ld%t%mo
  ld%t%da = ld%t%da
  ld%t%mn = ld%t%mn
  ld%t%ss = ld%t%ss
endif

call date2time(ld%t%time,ld%t%doyle,ld%t%gmt,ld%t%yr, &
  ld%t%mo,ld%t%da,ld%t%hr,ld%t%mn,ld%t%ss)
!-----
! Initialize LAI flag variable
!-----
```

```

ld%p%laiflag = 0

zeroi=0
numi=16
!-----
! Determine Monthly data Times (Assume Monthly
! value valid at DA=16 HR=00Z)
!-----
if (ld%%da .lt. 16) then
  mo1 = ld%%mo-1
  yr1 = ld%%yr
  if (mo1 .eq. 0) then
    mo1 = 12
    yr1 = ld%%yr - 1
  endif
  mo2 = ld%%mo
  yr2 = ld%%yr
else
  mo1 = ld%%mo
  yr1 = ld%%yr
  mo2 = ld%%mo+1
  yr2 = ld%%yr
  if (mo2 .eq. 13) then
    mo2 = 1
    yr2 = ld%%yr + 1
  endif
endif

call date2time(time1,doy1,gmt1,yr1,mo1,numi,zeroi,zeroi,zeroi)
call date2time(time2,doy2,gmt2,yr2,mo2,numi,zeroi,zeroi,zeroi)
!-----
! Check to see if need new LAI data
!-----
if (time2 .gt. ld%p%laitime) then
  ld%p%laiflag = 1
else
  ld%p%laiflag = 0
endif

avhrrdir = ld%p%avhrrdir
!-----
! Get new LAI data if required
!-----
if (ld%p%laiflag .eq. 1) then
  print*, 'in clmlai read.'
  write(unit=temp,fmt='(i4,i2.2)') yr1, mo1
  read (unit=temp,fmt='(a4,a2)') cyr1, cmo1
  write(unit=temp,fmt='(i4,i2.2)') yr2, mo2

```

```

    read (unit=temp,fmt='(a4,a2)') cyr2, cmo2

ld%p%laitime = time2
if(ld%d%domain ==6) then
  select case (ld%p%lai)
  case(1)
    call ncarlai_clm2(name9,name10,name11,name12,name13,name14,name15,name16, &
      ld%p%avhrrdir,cyr1,cyr2,cmo1,cmo2)
  case(2)
    call avhrr_file_5km(name,name2,name3,name4,name5,name6,name7,name8, &
      name9,name10,name11,name12,name13,name14,name15,name16, &
      ld%p%avhrrdir,cyr1,cyr2,cmo1,cmo2)
  case(3)
    call modis_file_2(name9,name10,name11,name12,name13,name14,name15,name16, &
      ld%p%modisdir,cyr1,cyr2,cmo1,cmo2)
  case default
    print*, "not a valid lai option"
    call endrun
  end select
else

  select case (ld%p%lai)
  case(1)
    call ncarlai_clm2(name9,name10,name11,name12,name13,name14,name15,name16, &
      ld%p%avhrrdir,cyr1,cyr2,cmo1,cmo2)
  case(2)
    call avhrr_file_2(name,name2,name3,name4,name5,name6,name7,name8, &
      name9,name10,name11,name12,name13,name14,name15,name16, &
      ld%p%avhrrdir,cyr1,cyr2,cmo1,cmo2)
  case(3)
    call modis_file_2(name9,name10,name11,name12,name13,name14,name15,name16, &
      ld%p%modisdir,cyr1,cyr2,cmo1,cmo2)
  case default
    print*, "not a valid lai option"
    call endrun
  end select
endif

!-----
! Open AVHRR LAI files (assumes realtime monthly files are present first
! then uses climatology files)
! Assume realtime monthly files are present as default
!-----

flag1 = 0
flag2 = 0
if(ld%d%domain ==6) then
  open(10,file=name9,status='old',form='unformatted',&
    access='direct',recl=22,iostat=ios1)
  open(11,file=name10,status='old',form='unformatted',&

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```

        access='direct',recl=22,iostat=ios2)
    open(12,file=name13,status='old',form='unformatted',&
        access='direct',recl=22,iostat=ios1)
    open(13,file=name14,status='old',form='unformatted',&
        access='direct',recl=22,iostat=ios2)
else
    open(10,file=name9,status='old',form='unformatted',&
        access='direct',recl=24,iostat=ios1)
    open(11,file=name10,status='old',form='unformatted',&
        access='direct',recl=24,iostat=ios2)
    open(12,file=name13,status='old',form='unformatted',&
        access='direct',recl=24,iostat=ios1)
    open(13,file=name14,status='old',form='unformatted',&
        access='direct',recl=24,iostat=ios2)
endif
print*, 'msg: clm2lairead -- using 1/8 avhrr lai/dsai data for month 1 ', &
    name9, ' (' ,iam, ' )'
print*, 'msg: clm2lairead -- using 1/8 avhrr lai/dsai data for month 2 ', &
    name10, ' (' ,iam, ' )'

if (ios1 .ne. 0) then
    close(10)
    if(ld%d%domain==6) then
        print*, 'open 10 .',name11
        open(10,file=name11,status='old',form='unformatted',&
            access='direct',recl=22)
        close(12)
        open(12,file=name15,status='old',form='unformatted',&
            access='direct',recl=22)
        print*, 'msg: clm2lairead -- no realtime monthly data for month 1',&
            ' (' ,iam, ' )'
        print*, 'msg: clm2lairead -- using 1/8 avhrr lai/dsai data for month 1 ', &
            name11, ' (' ,iam, ' )'
        flag1 = 1
    else
        print*, 'open 10 2 ',name11
        open(10,file=name11,status='old',form='unformatted',&
            access='direct',recl=24)
        close(12)
        open(12,file=name15,status='old',form='unformatted',&
            access='direct',recl=24)
        print*, 'msg: clm2lairead -- no realtime monthly data for month 1',&
            ' (' ,iam, ' )'
        print*, 'msg: clm2lairead -- using 1/8 avhrr lai/dsai data for month 1 ', &
            name11, ' (' ,iam, ' )'
        flag1 = 1
    endif
endif
endif

```

```

if (ios2 .ne. 0) then
  close(11)
  if( ld%d%domain ==6) then
    open(11,file=name12,status='old',form='unformatted',&
         access='direct',recl=22)
    close(13)
    open(13,file=name16,status='old',form='unformatted',&
         access='direct',recl=22)
    flag2 = 1
    print*, 'msg: clm2lairead -- no realtime monthly data for month 2', &
           ' (' ,iam, ' )'
    print*, 'msg: clm2lairead -- using 1/8 avhrr lai/dsai data for month 2 ', &
           name12, ' (' ,iam, ' )'
  else
    open(11,file=name12,status='old',form='unformatted',&
         access='direct',recl=24)
    close(13)
    open(13,file=name16,status='old',form='unformatted',&
         access='direct',recl=24)
    flag2 = 1
    print*, 'msg: clm2lairead -- no realtime monthly data for month 2', &
           ' (' ,iam, ' )'
    print*, 'msg: clm2lairead -- using 1/8 avhrr lai/dsai data for month 2 ', &
           name12, ' (' ,iam, ' )'
  endif
endif

do t=1,ld%d%nch
  latdeg = clm(t)%lat*180/shr_const_pi
  londeg = clm(t)%lon*180/shr_const_pi
  if (ld%d%domain .ne. 1 .and. ld%d%domain .le. 5) then

    select case (ld%d%domain)
    case (2)
      d_start_nr = ((latdeg - (-59.875)) / 0.25) + 1
      start_8th_nr = ((d_start_nr - 1) * 2) + 1
      end_8th_nr   = start_8th_nr + 1
      d_start_nc = ((londeg - (-179.875)) / 0.25) + 1
      start_8th_nc = ((d_start_nc - 1) * 2) + 1
      end_8th_nc   = start_8th_nc + 1
    case (3)
      d_start_nr = ((latdeg - (-60)) / 2.0) + 1
      start_8th_nr = ((d_start_nr - 1) * 16) + 1
      end_8th_nr   = start_8th_nr + 15
      d_start_nc = ((londeg - (-180)) / 2.5) + 1
      start_8th_nc = ((d_start_nc - 1) * 20) + 1
      end_8th_nc   = start_8th_nc + 19
    
```

```

case (4)
  d_start_nr = ((latdeg - (-59.500)) / 1.00) + 1
  start_8th_nr = ((d_start_nr - 1) * 8) + 1
  end_8th_nr = start_8th_nr + 7
  d_start_nc = ((londeg - (-179.500)) / 1.00) + 1
  start_8th_nc = ((d_start_nc - 1) * 8) + 1
  end_8th_nc = start_8th_nc + 7
case (5)
  d_start_nr = ((latdeg - (-59.750)) / 0.50) + 1
  start_8th_nr = ((d_start_nr - 1) * 4) + 1
  end_8th_nr = start_8th_nr + 3
  d_start_nc = ((londeg - (-179.750)) / 0.50) + 1
  start_8th_nc = ((d_start_nc - 1) * 4) + 1
  end_8th_nc = start_8th_nc + 3
case default
  print*, 'err: clm2lairead -- improper domain selection', '(',iam,')'
  call endrun
end select

!-----
! Initilaize sums for LAI month 1, LAI month 2, DSAI month 1, DSAI month 2
!-----

sum1 = 0.0
sum2 = 0.0
sum3 = 0.0
sum4 = 0.0
cnt1 = 0
cnt2 = 0
cnt3 = 0
cnt4 = 0

!-----
! Looping over 1/8 grid space that relates to 1/4 or 2x2.5 domains
!-----

do ii8 = start_8th_nr,end_8th_nr
  do j8 = start_8th_nc,end_8th_nc
    line = (ii8 - 1)*2880 + j8
    read(10,rec=line) lat1, lon1, lai_1
    read(12,rec=line) lat1, lon1, sai_1
    read(11,rec=line) lat2, lon2, lai_2
    read(13,rec=line) lat2, lon2, sai_2

    select case (ld%p%lai)

      case(2)      ! avhrr lai

        if (ichar(lai_1(clm(t)%itypveg+1)) .ne. 251 &
            .and. ichar(lai_1(clm(t)%itypveg+1)) .ne. 0) then
          sum1 = sum1 + (ichar(lai_1(clm(t)%itypveg+1))) * 0.04
          cnt1 = cnt1 + 1
        end if
      end select
    end do
  end do
end do

```

```

endif
if (ichar(sai_1(clm(t)%itypveg+1)) .ne. 251 &
    .and. ichar(sai_1(clm(t)%itypveg+1)) .ne. 0) then
    sum3 = sum3 + (ichar(sai_1(clm(t)%itypveg+1))) * 0.04
    cnt3 = cnt3 + 1
endif
if (ichar(lai_2(clm(t)%itypveg+1)) .ne. 251 &
    .and. ichar(lai_2(clm(t)%itypveg+1)) .ne. 0) then
    sum2 = sum2 + (ichar(lai_2(clm(t)%itypveg+1))) * 0.04
    cnt2 = cnt2 + 1
endif
if (ichar(sai_2(clm(t)%itypveg+1)) .ne. 251 &
    .and. ichar(sai_2(clm(t)%itypveg+1)) .ne. 0) then
    sum4 = sum4 + (ichar(sai_2(clm(t)%itypveg+1))) * 0.04
    cnt4 = cnt4 + 1
endif

case(3)      ! modis lai
if (ichar(lai_1(clm(t)%itypveg+1)) .lt. 200) then
    sum1 = sum1 + (ichar(lai_1(clm(t)%itypveg+1))) * 0.10
    cnt1 = cnt1 + 1
endif
if (ichar(sai_1(clm(t)%itypveg+1)) .lt. 200) then
    sum3 = sum3 + (ichar(sai_1(clm(t)%itypveg+1))) * 0.10
    cnt3 = cnt3 + 1
endif
if (ichar(lai_2(clm(t)%itypveg+1)) .lt. 200) then
    sum2 = sum2 + (ichar(lai_2(clm(t)%itypveg+1))) * 0.10
    cnt2 = cnt2 + 1
endif
if (ichar(sai_2(clm(t)%itypveg+1)) .lt. 200) then
    sum4 = sum4 + (ichar(sai_2(clm(t)%itypveg+1))) * 0.10
    cnt4 = cnt4 + 1
endif
case default
print*, 'err: clm2lairead -- not a valid lai domain', ' (' ,iam, ')'
call endrun

end select
enddo
enddo
!-----
! Compute averages for the vegetation type represented by tile
!-----
if (cnt1 .ne. 0) then
    lai_t1_f(t) = sum1 / cnt1
else
    lai_t1_f(t) = 0

```

```

endif
if (cnt2 .ne. 0) then
  lai_t2_f(t) = sum2 / cnt2
else
  lai_t2_f(t) = 0
endif
if (cnt3 .ne. 0) then
  sai_t1_f(t) = sum3 / cnt3
else
  sai_t1_f(t) = 0
endif
if (cnt4 .ne. 0) then
  sai_t2_f(t) = sum4 / cnt4
else
  sai_t2_f(t) = 0
endif
else
! MLAT = (LATDEG - (-59.9375)) / 0.125 + 1
! MLON = (LONDEG - (-179.9375)) / 0.125 + 1
! LINE = (MLAT - 1)*2880 + MLON
  mlat = (latdeg - (-59.975+0.05/2)) / 0.05 + 1
  mlon = (londeg - (-179.975+0.05/2)) / 0.05 + 1
  line = (mlat - 1)*7200 + mlon
  read(10,rec=line) lat1, lon1, lai_1
  read(12,rec=line) lat1, lon1, sai_1
  read(11,rec=line) lat2, lon2, lai_2
  read(13,rec=line) lat2, lon2, sai_2
  select case(ld%p%lai)
  case(2) ! avhrr lai
    lai_t1_f(t) = ichar(lai_1(clm(t)%itypveg+1)) * 0.04
    sai_t1_f(t) = ichar(sai_1(clm(t)%itypveg+1)) * 0.04
    lai_t2_f(t) = ichar(lai_2(clm(t)%itypveg+1)) * 0.04
    sai_t2_f(t) = ichar(sai_2(clm(t)%itypveg+1)) * 0.04
  case(3)
    lai_t1_f(t) = ichar(lai_1(clm(t)%itypveg+1)) * 0.10
    sai_t1_f(t) = ichar(sai_1(clm(t)%itypveg+1)) * 0.10
    lai_t2_f(t) = ichar(lai_2(clm(t)%itypveg+1)) * 0.10
    sai_t2_f(t) = ichar(sai_2(clm(t)%itypveg+1)) * 0.10
  case default
    print*, 'err: clm2lairead -- invalid domain for lai data', ' (' ,iam,')'
    call endrun
  end select
endif
enddo
close(10)
close(11)
close(12)
close(13)

```

```

!-----
! Determine weights between months
!-----
      wt1= (time2-ld%t%time)/(time2-time1)
      wt2= (ld%t%time-time1)/(time2-time1)
!-----
! Assign interpolated LAI and DSAI values to the CLM variable names
! used in CLM main
!-----
      do t=1,ld%d%nch
        clm(t)%tlai = wt1 * lai_t1_f(t) + wt2 * lai_t2_f(t)
        clm(t)%tsai = wt1 * sai_t1_f(t) + wt2 * sai_t2_f(t)
        if (clm(t)%itypveg .eq. 12) then
          clm(t)%tlai=0.0
          clm(t)%tsai=0.0
          clm(t)%htop=0.0
          clm(t)%hbot=0.0
        endif
        print*, t,clm(t)%tlai,clm(t)%tsai
      enddo

      if(ld%o%wparam.eq.1) then
        allocate(domlai(ld%d%lnc,ld%d%lnr))
        domlai = 0.0
        do t=1,ld%d%nch
          if(grid(t)%lat*1000.ge.ld%d%kgds(4).and. &
             grid(t)%lat*1000.le.ld%d%kgds(7).and. &
             grid(t)%lon*1000.ge.ld%d%kgds(5).and. &
             grid(t)%lon*1000.le.ld%d%kgds(8)) then
            rindex = tile(t)%row - (ld%d%kgds(4)-ld%d%kgds(44)) &
                      /ld%d%kgds(9)
            cindex = tile(t)%col - (ld%d%kgds(5)-ld%d%kgds(45)) &
                      /ld%d%kgds(10)
            domlai(cindex,rindex) = clm(t)%tlai
          endif
        enddo

        open(32,file="domlai.bin",form='unformatted')
        write(32) domlai
        close(32)
        deallocate(domlai)
      endif
    endif
  end subroutine clm2lairead

```

1.0.2 avhrr_file_2 (Source File: *clm2lairead.F90*)

This subroutine puts together AVHRR file name

INTERFACE:

```
subroutine avhrr_file_2 (NAME,NAME2,NAME3,NAME4,NAME5,NAME6,NAME7,NAME8, &
    NAME9,NAME10,NAME11,NAME12,NAME13,NAME14,NAME15,NAME16, &
    avhrrdir, cyr1, cyr2, cmo1, cmo2 )
```

CONTENTS:

```
92 format (80a1)
93 format (a80)
94 format (i4, i2, i2, i2)
95 format (10a1)
96 format (a40)
97 format (a9)
67 format (a15)
98 format (a1, a4, a2)
66 format (a5,a2)
99 format (7a1)

write(unit=temp1,fmt='(a40)') avhrrdir
write(unit=temp2,fmt='(a40)') avhrrdir
write(unit=temp3,fmt='(a40)') avhrrdir
write(unit=temp4,fmt='(a40)') avhrrdir

read(unit=temp1, fmt='(80a1)') (fbase(i), i=1,80)
read(unit=temp2, fmt='(80a1)') (fbase_2(i), i=1,80)
read(unit=temp3, fmt='(80a1)') (fbase_3(i), i=1,80)
read(unit=temp4, fmt='(80a1)') (fbase_4(i), i=1,80)

write(unit=temp1,fmt='(a1,a4,a2)') '/', cyr1, cmo1
read(unit=temp1, fmt='(7a1)') fdir
write(unit=temp2,fmt='(a1,a4,a2)') '/', cyr2, cmo2
read(unit=temp2, fmt='(7a1)') fdir_2
write(unit=temp3, fmt='(a5,a2)') '/CLIM', cmo1
read(unit=temp3, fmt='(7a1)') fdir_3
write(unit=temp4, fmt='(a5,a2)') '/CLIM', cmo2
read(unit=temp4,fmt='(7a1)') fdir_4

do i = 1, 7
    if ( fdir(i) == ' ' ) fdir(i) = '0'
    if ( fdir_2(i) == ' ' ) fdir_2(i) = '0'
    if ( fdir_3(i) == ' ' ) fdir_3(i) = '0'
    if ( fdir_4(i) == ' ' ) fdir_4(i) = '0'
enddo
```

```
write(unit=temp1, fmt='(a15)') '_AVHRR_LAI_0.125'  
write(unit=temp2, fmt='(a15)') '_AVHRR_LAI_0.125'  
write(unit=temp3, fmt='(a15)') '_AVHRR_LAI_0.125'  
write(unit=temp4, fmt='(a15)') '_AVHRR_LAI_0.125'  
read (unit=temp1, fmt='(80a1)') (fsubsn(i), i=1,15)  
read (unit=temp2, fmt='(80a1)') (fsubsn_2(i), i=1,15)  
read (unit=temp3, fmt='(80a1)') (fsubsn_3(i), i=1,15)  
read (unit=temp4, fmt='(80a1)') (fsubsn_4(i), i=1,15)  
write(unit=temp1, fmt='(a15)') '_AVHRR_SAI_0.125'  
write(unit=temp2, fmt='(a15)') '_AVHRR_SAI_0.125'  
write(unit=temp3, fmt='(a15)') '_AVHRR_SAI_0.125'  
write(unit=temp4, fmt='(a15)') '_AVHRR_SAI_0.125'  
read (unit=temp1, fmt='(80a1)') (fsubsn_5(i), i=1,15)  
read (unit=temp2, fmt='(80a1)') (fsubsn_6(i), i=1,15)  
read (unit=temp3, fmt='(80a1)') (fsubsn_7(i), i=1,15)  
read (unit=temp4, fmt='(80a1)') (fsubsn_8(i), i=1,15)  
  
c = 0  
do i = 1, 80  
  if ( (fbase(i) == ' ') .and. (c == 0) ) c = i-1  
  if ( (fbase_2(i) == ' ') .and. (c == 0) ) c = i-1  
  if ( (fbase_3(i) == ' ') .and. (c == 0) ) c = i-1  
  if ( (fbase_4(i) == ' ') .and. (c == 0) ) c = i-1  
end do  
  
write(unit=temp1, fmt='(80a1)') (fbase(i), i=1,c), (fdir(i), i=1,7), &  
  (fsubsn(i), i=1,15)  
write(unit=temp2, fmt='(80a1)') (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &  
  (fsubsn_2(i), i=1,15)  
write(unit=temp3, fmt='(80a1)') (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &  
  (fsubsn_3(i), i=1,15)  
write(unit=temp4, fmt='(80a1)') (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &  
  (fsubsn_4(i), i=1,15)  
read(unit=temp1, fmt='(a80)') name9  
read(unit=temp2, fmt='(a80)') name10  
read(unit=temp3, fmt='(a80)') name11  
read(unit=temp4, fmt='(a80)') name12  
write(unit=temp1, fmt='(80a1)') (fbase(i), i=1,c), (fdir(i), i=1,7), &  
  (fsubsn_5(i), i=1,15)  
write(unit=temp2, fmt='(80a1)') (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &  
  (fsubsn_6(i), i=1,15)  
write(unit=temp3, fmt='(80a1)') (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &  
  (fsubsn_7(i), i=1,15)  
write(unit=temp4, fmt='(80a1)') (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &  
  (fsubsn_8(i), i=1,15)  
read(unit=temp1, fmt='(a80)') name13  
read(unit=temp2, fmt='(a80)') name14  
read(unit=temp3, fmt='(a80)') name15
```

```

    read(unit=temp4, fmt='(a80)') name16

    return

```

1.0.3 avhrr_file_5KM (Source File: *clm2lairead.F90*)

This subroutine puts together AVHRR file name

INTERFACE:

```

subroutine avhrr_file_5KM (NAME,NAME2,NAME3,NAME4,NAME5,NAME6,NAME7,NAME8, &
    NAME9,NAME10,NAME11,NAME12,NAME13,NAME14,NAME15,NAME16, &
    avhrrdir, cyr1, cyr2, cmo1, cmo2 )

```

CONTENTS:

```

92 format (80a1)
93 format (a80)
94 format (i4, i2, i2, i2)
95 format (10a1)
96 format (a40)
97 format (a9)
67 format (a8)
68 format (a12)
98 format (a1, a4, a2)
66 format (a5,a2)
99 format (7a1)

```

```

    write(unit=temp1, fmt='(a40)') avhrrdir
    write(unit=temp2, fmt='(a40)') avhrrdir
    write(unit=temp3, fmt='(a40)') avhrrdir
    write(unit=temp4, fmt='(a40)') avhrrdir
    read(unit=temp1, fmt='(80a1)') (fbase(i), i=1,80)
    read(unit=temp2, fmt='(80a1)') (fbase_2(i), i=1,80)
    read(unit=temp3, fmt='(80a1)') (fbase_3(i), i=1,80)
    read(unit=temp4, fmt='(80a1)') (fbase_4(i), i=1,80)

    write(unit=temp1, fmt='(a1,a4,a2)') '/', cyr1, cmo1
    read(unit=temp1, fmt='(7a1)') fdir
    write(unit=temp2, fmt='(a1,a4,a2)') '/', cyr2, cmo2
    read(unit=temp2, fmt='(7a1)') fdir_2
    write(unit=temp3, fmt='(a5,a2)') '/CLIM', cmo1
    read(unit=temp3, fmt='(7a1)') fdir_3
    write(unit=temp4, fmt='(a5,a2)') '/CLIM', cmo2
    read(unit=temp4, fmt='(7a1)') fdir_4

```

```

do i = 1, 7

```

```
    if ( fdir(i) == ' ' ) fdir(i) = '0'
    if ( fdir_2(i) == ' ' ) fdir_2(i) = '0'
    if ( fdir_3(i) == ' ' ) fdir_3(i) = '0'
    if ( fdir_4(i) == ' ' ) fdir_4(i) = '0'
  enddo

write(unit=temp1, fmt='(a8)') '_5KM.bin'
write(unit=temp2, fmt='(a8)') '_5KM.bin'
write(unit=temp3, fmt='(a8)') '_5KM.bin'
write(unit=temp4, fmt='(a8)') '_5KM.bin'
read (unit=temp1, fmt='(80a1)') (fsubsn(i), i=1,15)
read (unit=temp2, fmt='(80a1)') (fsubsn_2(i), i=1,15)
read (unit=temp3, fmt='(80a1)') (fsubsn_3(i), i=1,15)
read (unit=temp4, fmt='(80a1)') (fsubsn_4(i), i=1,15)
write(unit=temp1, fmt='(a12)') '_SAI_5KM.bin'
write(unit=temp2, fmt='(a12)') '_SAI_5KM.bin'
write(unit=temp3, fmt='(a12)') '_SAI_5KM.bin'
write(unit=temp4, fmt='(a12)') '_SAI_5KM.bin'
read (unit=temp1, fmt='(80a1)') (fsubsn_5(i), i=1,15)
read (unit=temp2, fmt='(80a1)') (fsubsn_6(i), i=1,15)
read (unit=temp3, fmt='(80a1)') (fsubsn_7(i), i=1,15)
read (unit=temp4, fmt='(80a1)') (fsubsn_8(i), i=1,15)

c = 0
do i = 1, 80
  if ( (fbase(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_2(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_3(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_4(i) == ' ') .and. (c == 0) ) c = i-1
end do

write(unit=temp1, fmt='(80a1)') (fbase(i), i=1,c), (fdir(i), i=1,7), &
  (fsubsn(i), i=1,15)
write(unit=temp2, fmt='(80a1)') (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
  (fsubsn_2(i), i=1,15)
write(unit=temp3, fmt='(80a1)') (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
  (fsubsn_3(i), i=1,15)
write(unit=temp4, fmt='(80a1)') (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
  (fsubsn_4(i), i=1,15)
read(unit=temp1, fmt='(a80)') name9
read(unit=temp2, fmt='(a80)') name10
read(unit=temp3, fmt='(a80)') name11
read(unit=temp4, fmt='(a80)') name12
write(unit=temp1, fmt='(80a1)') (fbase(i), i=1,c), (fdir(i), i=1,7), &
  (fsubsn_5(i), i=1,15)
write(unit=temp2, fmt='(80a1)') (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
  (fsubsn_6(i), i=1,15)
write(unit=temp3, fmt='(80a1)') (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
```

```

      (fsubsn_7(i), i=1,15)
write(unit=temp4, fmt='(80a1)') (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
      (fsubsn_8(i), i=1,15)
read(unit=temp1, fmt='(a80)') name13
read(unit=temp2, fmt='(a80)') name14
read(unit=temp3, fmt='(a80)') name15
read(unit=temp4, fmt='(a80)') name16
print*, 'n11',name11
print*, 'n15',name15
return

```

1.0.4 ncarlai_clm2 (Source File: *clm2lairead.F90*)

This subroutine puts together NCAR LAI/SAI/TOP/BOT file names

INTERFACE:

```

subroutine ncarlai_clm2 (NAME9,NAME10,NAME11,NAME12,NAME13,NAME14,NAME15,NAME16, &
      avhrrdir, cyr1, cyr2, cmo1, cmo2 )

```

CONTENTS:

```

92 format (80a1)
93 format (a80)
94 format (i4, i2, i2, i2)
95 format (10a1)
96 format (a40)
97 format (a9)
67 format (a15)
98 format (a1, a4, a2)
66 format (a5,a2)
99 format (7a1)

open(unit=90, file='temp', form='formatted', access='direct', recl=80)
open(unit=91, file='temp_2', form='formatted', access='direct', recl=80)
open(unit=92, file='temp_3', form='formatted', access='direct', recl=80)
open(unit=93, file='temp_4', form='formatted', access='direct', recl=80)
write(90, 96, rec=1) avhrrdir
write(91, 96, rec=1) avhrrdir
write(92, 96, rec=1) avhrrdir
write(93, 96, rec=1) avhrrdir
read(90, 92, rec=1) (fbase(i), i=1,80)
read(91, 92, rec=1) (fbase_2(i), i=1,80)
read(92, 92, rec=1) (fbase_3(i), i=1,80)
read(93, 92, rec=1) (fbase_4(i), i=1,80)

write(90, 98, rec=1) '/', cyr1, cmo1

```

```
read(90, 99, rec=1) fdir
write(91, 98, rec=1) '/', cyr2, cmo2
read(91, 99, rec=1) fdir_2
write(92, 66, rec=1) '/CLIM', cmo1
read(92, 99, rec=1) fdir_3
write(93, 66, rec=1) '/CLIM', cmo2
read(93, 99, rec=1) fdir_4

do i = 1, 7
  if ( fdir(i) == ' ' ) fdir(i) = '0'
  if ( fdir_2(i) == ' ' ) fdir_2(i) = '0'
  if ( fdir_3(i) == ' ' ) fdir_3(i) = '0'
  if ( fdir_4(i) == ' ' ) fdir_4(i) = '0'
enddo

write(90, 67, rec=1) '_NCLM2LAI_0.125'
write(91, 67, rec=1) '_NCLM2LAI_0.125'
write(92, 67, rec=1) '_NCLM2LAI_0.125'
write(93, 67, rec=1) '_NCLM2LAI_0.125'
read (90, 92, rec=1) (fsubsn(i), i=1,15)
read (91, 92, rec=1) (fsubsn_2(i), i=1,15)
read (92, 92, rec=1) (fsubsn_3(i), i=1,15)
read (93, 92, rec=1) (fsubsn_4(i), i=1,15)
write(90, 67, rec=1) '_NCLM2SAI_0.125'
write(91, 67, rec=1) '_NCLM2SAI_0.125'
write(92, 67, rec=1) '_NCLM2SAI_0.125'
write(93, 67, rec=1) '_NCLM2SAI_0.125'
read (90, 92, rec=1) (fsubsn_5(i), i=1,15)
read (91, 92, rec=1) (fsubsn_6(i), i=1,15)
read (92, 92, rec=1) (fsubsn_7(i), i=1,15)
read (93, 92, rec=1) (fsubsn_8(i), i=1,15)

c = 0
do i = 1, 80
  if ( (fbase(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_2(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_3(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_4(i) == ' ') .and. (c == 0) ) c = i-1
end do

write(90, 92, rec=1) (fbase(i), i=1,c), (fdir(i), i=1,7), &
  (fsubsn(i), i=1,15)
write(91, 92, rec=1) (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
  (fsubsn_2(i), i=1,15)
write(92, 92, rec=1) (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
  (fsubsn_3(i), i=1,15)
write(93, 92, rec=1) (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
  (fsubsn_4(i), i=1,15)
```

```
read(90, 93, rec=1) name9
read(91, 93, rec=1) name10
read(92, 93, rec=1) name11
read(93, 93, rec=1) name12
write(90, 92, rec=1) (fbase(i), i=1,c), (fdir(i), i=1,7), &
                    (fsubsn_5(i), i=1,15)
write(91, 92, rec=1) (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
                    (fsubsn_6(i), i=1,15)
write(92, 92, rec=1) (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
                    (fsubsn_7(i), i=1,15)
write(93, 92, rec=1) (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
                    (fsubsn_8(i), i=1,15)

read(90, 93, rec=1) name13
read(91, 93, rec=1) name14
read(92, 93, rec=1) name15
read(93, 93, rec=1) name16

close(90)
close(91)
close(92)
close(93)
return
```

1.0.5 ncarcanht_clm2 (Source File: *clm2lairead.F90*)

This subroutine puts together NCAR TOP/BOT file names

INTERFACE:

```
subroutine ncarcanht_clm2 (NTOP1,NTOP2,NBOT1,NBOT2, &
                          avhrrdir, cyr1, cyr2, cmo1, cmo2 )
```

CONTENTS:

```
92 format (80a1)
93 format (a80)
94 format (i4, i2, i2, i2)
95 format (10a1)
96 format (a40)
97 format (a9)
67 format (a15)
98 format (a1, a4, a2)
66 format (a5,a2)
99 format (7a1)
```

```
open(unit=90, file='temp', form='formatted', access='direct', recl=80)
open(unit=91, file='temp_2', form='formatted', access='direct', recl=80)
```

```
open(unit=92, file='temp_3', form='formatted', access='direct', recl=80)
open(unit=93, file='temp_4', form='formatted', access='direct', recl=80)
write(90, 96, rec=1) avhrrdir
write(91, 96, rec=1) avhrrdir
write(92, 96, rec=1) avhrrdir
write(93, 96, rec=1) avhrrdir
read(90, 92, rec=1) (fbase(i), i=1,80)
read(91, 92, rec=1) (fbase_2(i), i=1,80)
read(92, 92, rec=1) (fbase_3(i), i=1,80)
read(93, 92, rec=1) (fbase_4(i), i=1,80)

write(90, 66, rec=1) '/CLIM', cmo1
read(90, 99, rec=1) fdir
write(91, 66, rec=1) '/CLIM', cmo2
read(91, 99, rec=1) fdir_2
write(92, 66, rec=1) '/CLIM', cmo1
read(92, 99, rec=1) fdir_3
write(93, 66, rec=1) '/CLIM', cmo2
read(93, 99, rec=1) fdir_4

do i = 1, 7
  if ( fdir(i) == ' ' ) fdir(i) = '0'
  if ( fdir_2(i) == ' ' ) fdir_2(i) = '0'
  if ( fdir_3(i) == ' ' ) fdir_3(i) = '0'
  if ( fdir_4(i) == ' ' ) fdir_4(i) = '0'
enddo

write(90, 67, rec=1) '_NCLM2TOP_0.125'
write(91, 67, rec=1) '_NCLM2TOP_0.125'
write(92, 67, rec=1) '_NCLM2BOT_0.125'
write(93, 67, rec=1) '_NCLM2BOT_0.125'
read (90, 92, rec=1) (fsubsn(i), i=1,15)
read (91, 92, rec=1) (fsubsn_2(i), i=1,15)
read (92, 92, rec=1) (fsubsn_3(i), i=1,15)
read (93, 92, rec=1) (fsubsn_4(i), i=1,15)
c = 0
do i = 1, 80
  if ( (fbase(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_2(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_3(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_4(i) == ' ') .and. (c == 0) ) c = i-1
end do

write(90, 92, rec=1) (fbase(i), i=1,c), (fdir(i), i=1,7), &
                    (fsubsn(i), i=1,15)
write(91, 92, rec=1) (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
                    (fsubsn_2(i), i=1,15)
write(92, 92, rec=1) (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
```

```

                (fsubsn_3(i), i=1,15)
write(93, 92, rec=1) (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
                (fsubsn_4(i), i=1,15)
read(90, 93, rec=1) ntop1
read(91, 93, rec=1) ntop2
read(92, 93, rec=1) nbot1
read(93, 93, rec=1) nbot2

close(90)
close(91)
close(92)
close(93)

return

```

1.0.6 modis_file_2 (Source File: *clm2lairead.F90*)

This subroutine puts together MODIS file name

INTERFACE:

```

subroutine modis_file_2 (NAME9,NAME10,NAME11,NAME12,NAME13,NAME14,NAME15,NAME16, &
    modisdir, cyr1, cyr2, cmo1, cmo2 )

```

CONTENTS:

```

92 format (80a1)
93 format (a80)
94 format (i4, i2, i2, i2)
95 format (10a1)
96 format (a40)
97 format (a9)
67 format (a15)
98 format (a1, a4, a2)
66 format (a5,a2)
99 format (7a1)

open(unit=90, file='temp', form='formatted', access='direct', recl=80)
open(unit=91, file='temp_2', form='formatted', access='direct', recl=80)
open(unit=92, file='temp_3', form='formatted', access='direct', recl=80)
open(unit=93, file='temp_4', form='formatted', access='direct', recl=80)
write(90, 96, rec=1) modisdir
write(91, 96, rec=1) modisdir
write(92, 96, rec=1) modisdir
write(93, 96, rec=1) modisdir
read(90, 92, rec=1) (fbase(i), i=1,80)
read(91, 92, rec=1) (fbase_2(i), i=1,80)

```

```
read(92, 92, rec=1) (fbase_3(i), i=1,80)
read(93, 92, rec=1) (fbase_4(i), i=1,80)

write(90, 98, rec=1) '/', cyr1, cmo1
read(90, 99, rec=1) fdir
write(91, 98, rec=1) '/', cyr2, cmo2
read(91, 99, rec=1) fdir_2
write(92, 66, rec=1) '/CLIM', cmo1
read(92, 99, rec=1) fdir_3
write(93, 66, rec=1) '/CLIM', cmo2
read(93, 99, rec=1) fdir_4

do i = 1, 7
  if ( fdir(i) == ' ' ) fdir(i) = '0'
  if ( fdir_2(i) == ' ' ) fdir_2(i) = '0'
  if ( fdir_3(i) == ' ' ) fdir_3(i) = '0'
  if ( fdir_4(i) == ' ' ) fdir_4(i) = '0'
enddo

write(90, 67, rec=1) '_MODISLAI_0.125'
write(91, 67, rec=1) '_MODISLAI_0.125'
write(92, 67, rec=1) '_MODISLAI_0.125'
write(93, 67, rec=1) '_MODISLAI_0.125'
read (90, 92, rec=1) (fsubsn(i), i=1,15)
read (91, 92, rec=1) (fsubsn_2(i), i=1,15)
read (92, 92, rec=1) (fsubsn_3(i), i=1,15)
read (93, 92, rec=1) (fsubsn_4(i), i=1,15)
write(90, 67, rec=1) '_MODISSAI_0.125'
write(91, 67, rec=1) '_MODISSAI_0.125'
write(92, 67, rec=1) '_MODISSAI_0.125'
write(93, 67, rec=1) '_MODISSAI_0.125'
read (90, 92, rec=1) (fsubsn_5(i), i=1,15)
read (91, 92, rec=1) (fsubsn_6(i), i=1,15)
read (92, 92, rec=1) (fsubsn_7(i), i=1,15)
read (93, 92, rec=1) (fsubsn_8(i), i=1,15)

c = 0
do i = 1, 80
  if ( (fbase(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_2(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_3(i) == ' ') .and. (c == 0) ) c = i-1
  if ( (fbase_4(i) == ' ') .and. (c == 0) ) c = i-1
end do

write(90, 92, rec=1) (fbase(i), i=1,c), (fdir(i), i=1,7), &
                    (fsubsn(i), i=1,15)
write(91, 92, rec=1) (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
                    (fsubsn_2(i), i=1,15)
```

```
write(92, 92, rec=1) (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
                    (fsubsn_3(i), i=1,15)
write(93, 92, rec=1) (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
                    (fsubsn_4(i), i=1,15)
read(90, 93, rec=1) name9
read(91, 93, rec=1) name10
read(92, 93, rec=1) name11
read(93, 93, rec=1) name12

write(90, 92, rec=1) (fbase(i), i=1,c), (fdir(i), i=1,7), &
                    (fsubsn_5(i), i=1,15)
write(91, 92, rec=1) (fbase_2(i), i=1,c), (fdir_2(i), i=1,7), &
                    (fsubsn_6(i), i=1,15)
write(92, 92, rec=1) (fbase_3(i), i=1,c), (fdir_3(i), i=1,7), &
                    (fsubsn_7(i), i=1,15)
write(93, 92, rec=1) (fbase_4(i), i=1,c), (fdir_4(i), i=1,7), &
                    (fsubsn_8(i), i=1,15)
read(90, 93, rec=1) name13
read(91, 93, rec=1) name14
read(92, 93, rec=1) name15
read(93, 93, rec=1) name16

close(90)
close(91)
close(92)
close(93)

return
```